CHAPTER 5

GALLEY AND LAUNDRY EQUIPMENT

Learning Objective: Recall the procedures required for the maintenance of galley equipment and the procedures for installing, maintaining, troubleshooting, and repairing laundry equipment.

Most stateside galleys and laundries, as well as many overseas, are now operated and maintained through civilian contracts. But there are still installations maintained by overseas Public Works Departments, which require military personnel. This chapter presents information on the maintenance of common types of galley and laundry equipment. Because of the contracted galley and laundry facilities and differences in types of equipment you are expected to maintain, only general information is presented in this chapter. Remember you should study the manufacturer's manual that comes with a new piece of equipment before you attempt to install or maintain it.

GALLEY EQUIPMENT

Learning Objective: Identify different types of galley equipment and recall the procedures required for their maintenance.

Galley equipment must be maintained in a safe, sanitary, and economical way. Utilitiesmen not only install and maintain the equipment but they also supervise others who perform work on the equipment. It is always a good practice to post operating instructions near the various pieces of equipment in a galley or a bakeshop. This action should reduce the number of operators who abuse the machines. This is particularly important where messmen and strikers are working. As a further safeguard, you should conduct periodic preventive maintenance inspections as required for the equipment at your location or as called for in the manufacturer's instructions. After the inspection, you should attach a tag to each piece of equipment that contains pertinent information, such as the date, the type of inspection, and by whom the inspection was made.

The maintenance of food preparation equipment may vary. In peacetime, most types of equipment are located in a permanent galley or bakeshop. While deployed to an island or an overseas shore station, a construction battalion might have either a permanent galley or a semi-permanent galley, using either field units or fixed types of equipment.

Whatever the need or the location, your most important duty is to keep all items of equipment in a condition of readiness to ensure safe, sanitary, and excellent operation at all times. The medical department is responsible for conducting sanitary inspections, and the supply department is responsible for preparing food and keeping food-handling equipment and spaces clean. Coordinate your maintenance efforts in conjunction with these departments. Once any maintenance or repair is completed on equipment, ensure that it is inspected before it is put back into service for food preparation. Field galley range is briefly covered in this chapter. For more information on its operation, refer to chapter 2 of *Utilitiesman Basic,* volume 1, NAVEDTRA 11019.

STEAM KETTLES

Steam kettles, more commonly called "coppers," are either direct-steam or self-contained type units. Self-contained units generate their own steam though either a gas burner or electrical connections. Direct-steam coppers are supplied with steam from a central boiler located in the galley. Because direct-steam units are more common than self-contained units, this chapter mainly covers direct-steam coppers.

Maintenance requirements for coppers are small when compared to other pieces of galley equipment. You should consider this fact when you are developing a preventive maintenance inspection schedule. The maintenance schedule for coppers requires monthly inspections and an annual preventive maintenance inspection. When conducting monthly or annual

inspections, talk to galley personnel about the operation of the coppers. These personnel can give you information that will assist you in diagnosing possible operational or maintenance problems. A few factors for inspecting direct-steam coppers (fig. 5-1) are as follows:

MONTHLY inspection:

- Check the faucets, valves, and piping for leaks.
- Check the steam pressure-reducing valve to ensure it is in good condition and functions properly.
- Lubricate the hinges of the cover with mineral oil.

ANNUAL inspection:

- Check the copper for leaks, cracks, and dents.
- Examine the cover, hinges, and latch for warp and alignment.
- Check the steam and condensate piping, valves, and traps for leaks and obstructions.
- Remove the safety valves and remove any rust and corrosion using Navy-approved solvents. Then, lubricate and calibrate the valves before replacing them.

Other than visual inspections, each individual piece of galley equipment requires its own type of preventive maintenance. Recommended schedules for inspection and maintenance of coppers are provided in table P of appendix II.

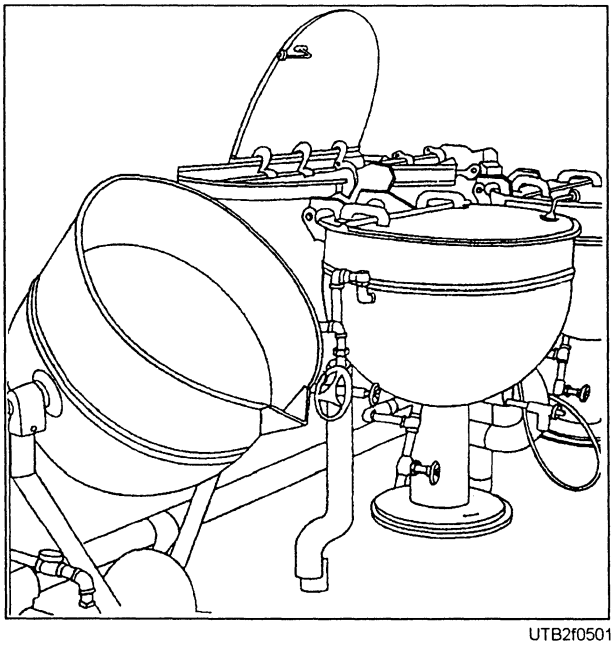

Figure 5-1.—A pedestal and a trunnion or tilt type of direct-steam coppers.

STEAM CHESTS

Steam chests are used to cook food through a steaming process. The escape of steam from a steam chest harms the food being prepared and also poses a safety hazard to personnel. To ensure steam-tight operation, ensure the door latches, hinges, and gaskets are kept close fitting. A physical preventive maintenance inspection of the steam chests (fig. 5-2) should be made each week.

The weekly inspection should ensure the following:

- The compartment drains are free of obstructions.
- The door hinges, locking devices, and shelf drawbars work well.
- The pressure setting of the gauge pressure is correct.

When a plunger type of valve is used with the locking device, the plunger must be adjusted so the valve is fully depressed when the door is closed. This action allows a full measure of steam to enter the compartment. When the door is opened, the valve must function to stop the steam supply completely. To ensure a tight fit of the doors, replace hinge pins and bushings when they show too much wear. Some full-floating doors are adjustable by means of hexagon-head bolts extending through the door near each corner. When door gaskets must be replaced, you must remove the door from the unit because this makes it easier to remove the worn gasket and to clean the channel. Failure to complete these actions can provide a path for steam leakage. Apply gasket cement, and then force the new gasket into the channel at the corners, working it in toward the center of the sides and ends. You are now ready to hang the door; but first, place paper along the edge of the door opening to prevent excess cement from adhering to the mating surfaces when the door is closed. Any surplus cement can be cleaned off after it has hardened. When the door has hexagon-head bolts, adjust them so the closed door touches the steamer evenly without binding at the corners. Unless you have a good fit, the gasket will cut by the corners of the door and steam will escape. For inspection and preventive maintenance of the steam service and condensate system, include those items that apply in table P of appendix II.

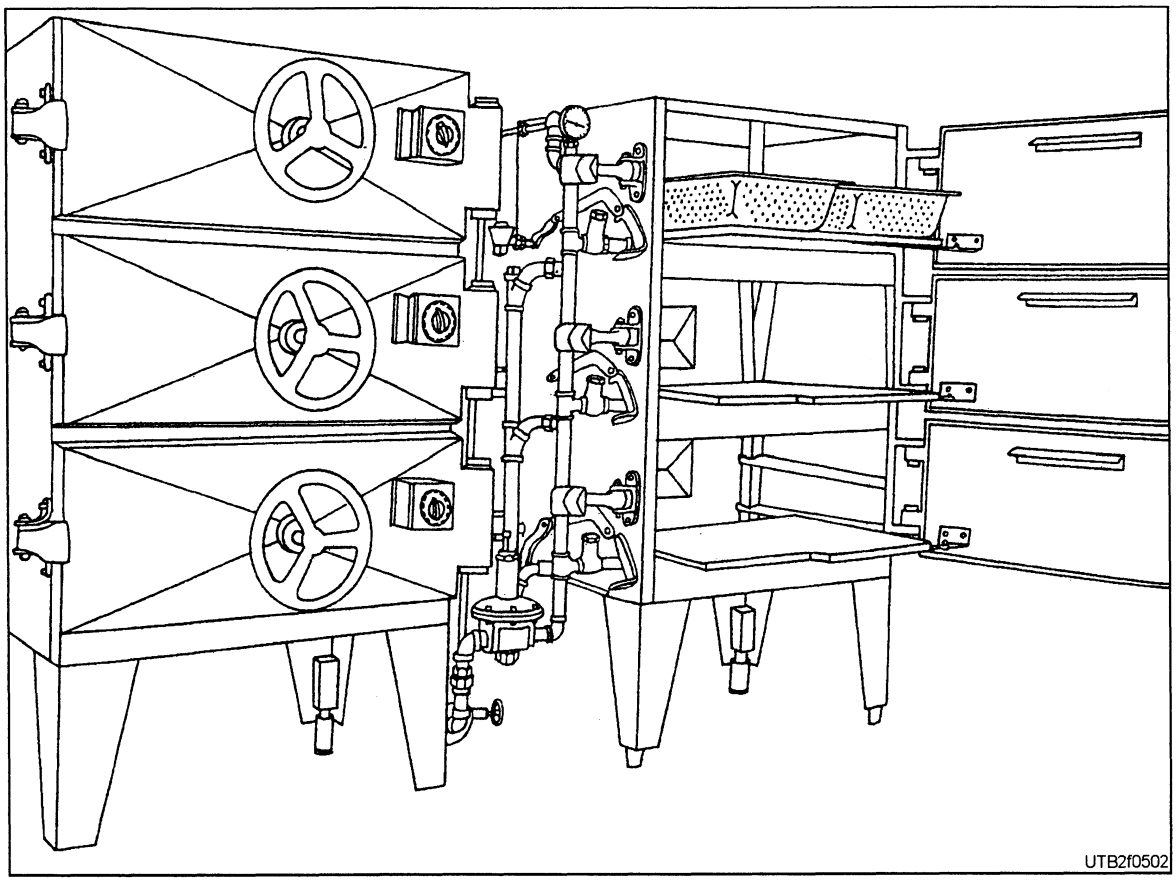

Figure 5-2.—Direct-connected steam chests.

STEAM TABLES

Steam tables are used to keep food hot during serving by use of steam and hot water. Steam tables (fig. 5-3) should be carefully inspected monthly and yearly.

The MONTHLY inspection should include the following:

- Check the water compartment, steam coil, valves, and piping for leaks and corrosion.
- Check the steam pressure on the gauge, keeping in mind that the PRESSURE SHOULD NOT EXCEED MAXIMUM PRESSURE SHOWN ON THE NAMEPLATE.
- Check and calibrate the temperature control, if needed.

The ANNUAL inspection should include the following:

- Descale the water compartment, examine the top and frame for scale, and check the level of the steam tabletop.

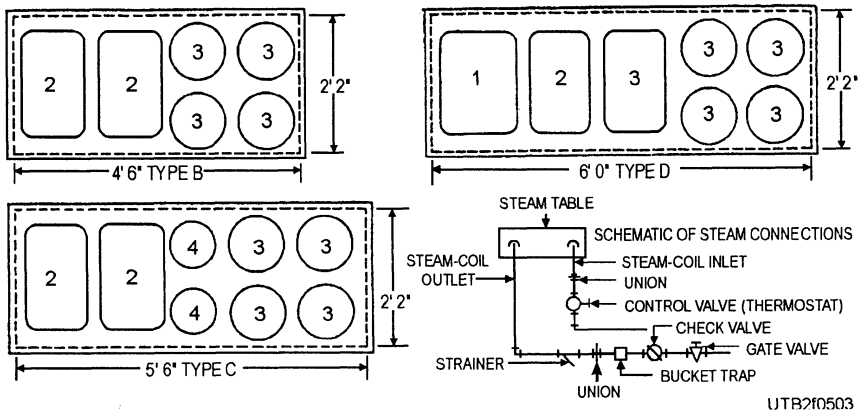

Figure 5-3.—Schematic drawing of a steam table.

- Remove the rust and corrosion within the water compartment, as necessary, with solvent, and paint the bare spots with heat-resistant aluminum paint.
- Check the thermostat with a mercury thermometer. The thermostat must be accurate to within either plus or minus 5°F.

NOTE

Use table P of appendix II to check other items that apply to this equipment.

DISHWASHERS

From time to time, you may be called upon to adjust dishwashing machines that have become defective (figs. 5-4 and 5-5). Some of the most common difficulties, the usual reasons for their occurrence, and possible remedies for them are listed in table Q of appendix II.

Now and then, descaling deposits from within the machine, the piping, and the pumps will be required. You can fill the tank halfway with hot water, add an approved cleaning solution, fill the tanks to overflowing, and then operate the machine for 30 minutes at high temperature with trays, spray arms, and curtains in place. Next, drain the tanks and fill them with hot water and run the machine for 5 minutes. This rinsing action should be repeated several times to make sure all of the cleaning solution is removed from the unit.

Dishwashing machines and accessories should be lubricated according to the manufacturer's instructions. This is especially true in the selection of

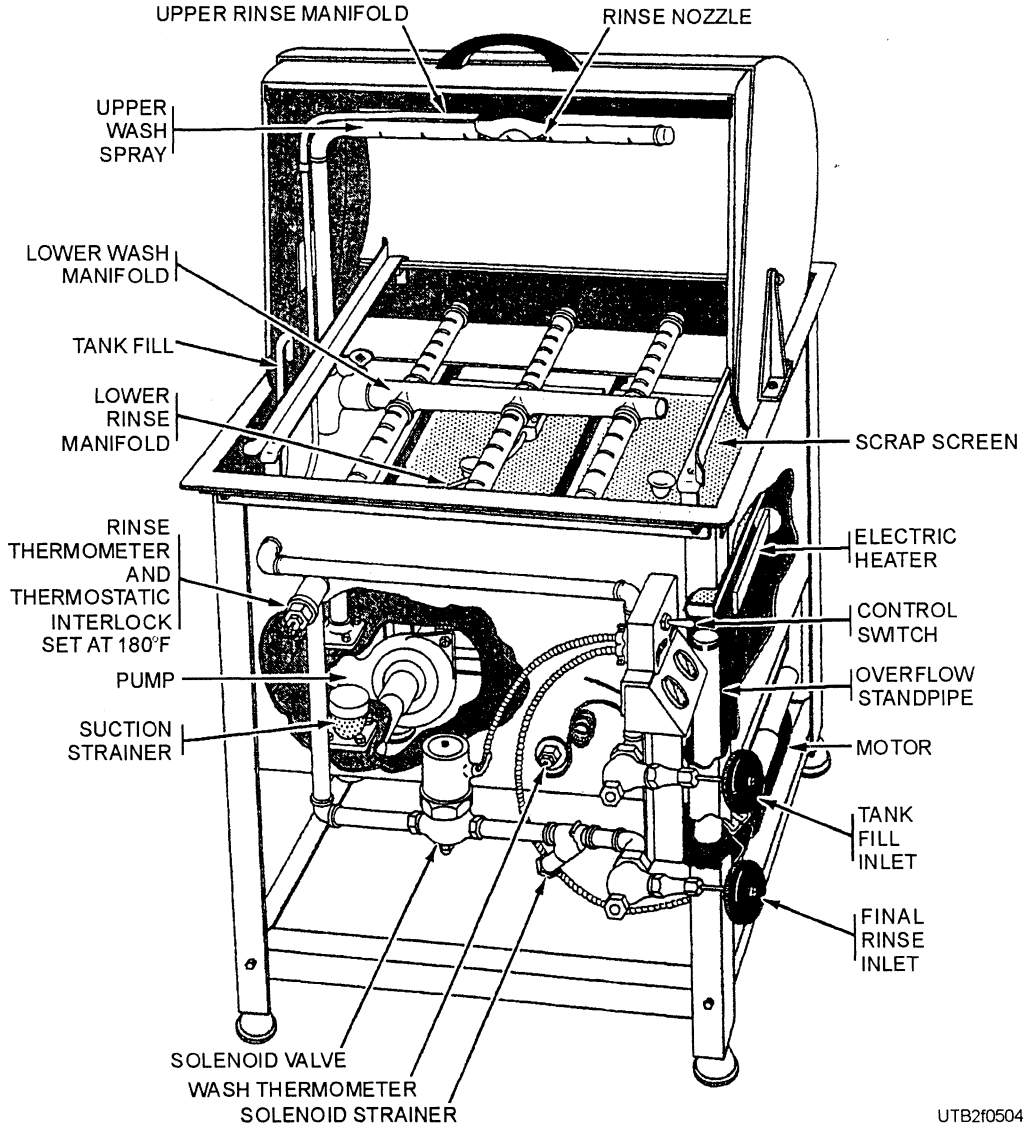

Figure 5-4.—A semiautomatic single-tank dishwasher.

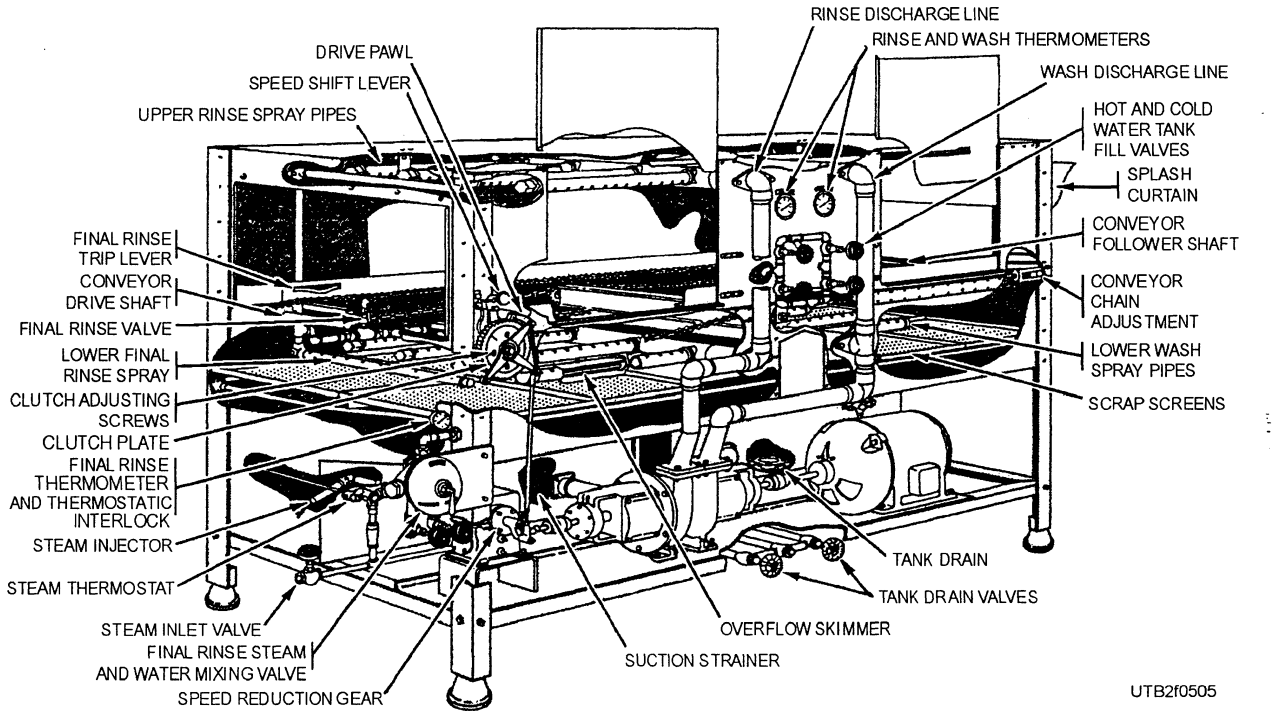

Figure 5-5.—A cutaway view of a double-tank automatic dishwasher.

grades and viscosities of the oil used, the levels at which the oil is to be maintained, and the places to be oiled. All damaged or missing lubrication fittings should be replaced. The grease cups on the drive end, connecting rod, and the rinse lever should be turned once each quarter and be refilled when empty. Also, the revolving wash arms and valve stems should have a few drops of light oil applied to them about once each quarter.

CAUTION

Be sure to turn off the power before lubricating the equipment.

Because of limited space, this chapter does not attempt to provide all the necessary details concerning the parts and accessories of dishwashing machines. Study the manufacturer's manual for the type and make of machine concerned. Some of the machine parts and accessories of the dishwasher that should be maintained and serviced regularly are as follows:

- Repair or replace the torn or worn curtains.
- Straighten the warped pans so they stay flat in the machine.
- Replace the packing with new material of the same type and size. Do not overpack the packing gland because this condition causes binding of the shaft.
- Replace the broken or damaged thermometers. Check the accuracy of the thermometer by measuring the water temperature with a high-grade thermometer and comparing results with a thermostat setting. The thermostat should be set for a wash water temperature between 138°F to 145°F and rinse water for a temperature of 180°F or above.
- Defective conveyors should be properly adjusted or replaced. Check the nylon covering of steel parts and replace the coverings when they are worn or torn.
- The inspection doors of wash and rinse compartments should be kept tight at all times.
- Straighten or replace bent or loose doors.
- Check the chains and pulleys of counterbalanced doors. Apply oil regularly to moving parts.
- Check the dish racks for bent or warped surfaces and replace broken parts.

- Inspect the utility fittings, such as steam coils, traps, heating elements, gas burners, and all thermostats. Follow the manufacturer's repair instructions. Usually, you have to detach these component parts and take them to the maintenance shop for repairs.
- Frequently check the ventilating hoods (if installed), the hood fans, and fan accessories, such as baffles, clampers, vanes, access doors, louvers, registers, protective grilles, and bird or insect screens for corrosion and rust.
- Check the ventilating hood fans for grease and other impurities that should be scraped off with a knife. Tighten any items that have become loosened by vibration.
- Remove the rust from dishwashers with solvents and paint over corroded areas with two coats of rust-resistant paint. In selecting a solvent, use the air-inhibited sulfamic acid type according to the manufacturer's instructions.

CAUTION

Never use steel wool for cleaning interior surfaces of dishwashers because small particles may contact dishes and eventually become embedded in food.

With regular inspection and lubrication, with repairs and adjustments made as necessary, and with strict observance of the manufacturer's operating instructions, these machines will last along time. To ensure they receive the required attention, set up a regular schedule of inspection. Monthly and annual inspections may be satisfactory in many cases.

MONTHLY inspect ion and maintenance should include the following:

- Check the lubrication of bearings, gearboxes, chains, and sprockets; lubricants should be added, if required.
- Check the drive V-belt tension and alignment, flexible couplings, chains, and sprockets.
- Check the electrical components for proper functioning and safety features, including proper grounding.
- Ensure the machine and the tables are level; check for misalignment of parts, loose parts and leaks, and unusual noises.
- Check the piping system for faults.

During ANNUAL inspections, give careful attention to the following:

- Check the frames for adequacy of support; tightness of casings, seams, joints, and counterweights; evidence of corrosion; watertightness of doors, hinges, and gaskets; and correctness of clearance and alignment.
- Check the pumps and impellers for corrosion or extreme wear of parts. Disassemble them, clean all parts thoroughly, and repair or replace badly worn parts. Reassemble and adjust.
- Lubricate all parts requiring lubrication.
- Be sure to tag the dishwasher, stating the date of the current inspection, repairs made, and the date of the next inspection.

RANGES

Observing a schedule of monthly and annual inspections ensures the safe and efficient operation of a range, including the oven, broiler, griddle, and so on. Some of the major items that should be covered as part of the MONTHLY inspection are as follows:

- Check the pipe for leaks.
- Clean and lubricate the motors.
- Check the burner flame. Remember, the burner should give off a blue flame when the air-oil mixture is correct. A flue-gas analysis should be performed to find the proper fuel-air mixture.
- Check the equipment for alignment and fit of doors, for sliding action of racks, and for levelness.

The ANNUAL inspection of oil- and gas-fired equipment should include the following:

- Check on all the parts for damage, corrosion, and lack of paint. Remove the rust with solvents, and paint the bare spots with heat-resistant aluminum paint. (**NOTE:** If bare spots total more than 20 percent of the entire surface, paint the equipment.)
- Check the thermostat. If the accuracy of the thermostat cannot be adjusted to within 5°F accuracy, replace it with a new thermostat.
- Clean soot deposits and jet openings and repair or replace leaking piping. Clean and tighten the nuts and bolts.

NOTE

Refer to table R of appendix II for a trouble-shooting chart covering the maintenance of ranges, ovens, and broilers.

FIELD RANGE

As a Utilitiesman, you need to know how to maintain, repair, and troubleshoot the field range. Unfortunately, this manual can NOT cover all you need to know about the field range; therefore, you should have your supervisor refer you to other sources of pertinent information. A gas-fired field range is shown in figure 5-6 and the procedures for setting up and operating the range burner unit is detailed in chapter 2, *Utilitiesman Basic,* volume 1, NAVEDTRA 11019.

Keeping the field range in a constant state of readiness is important to everyone in the field. This is accomplished by performing preventive maintenance checks and services quarterly or after every 250 hours of operation, whichever occurs first. Table R of appendix II provides a listing of possible malfunctions that may occur in the field range outfit. This listing will help vou in diagnosing and correcting unsatisfactory operation or failure of the field range outfit. Also, an excellent source of information is listed in the references listed in appendix IV.

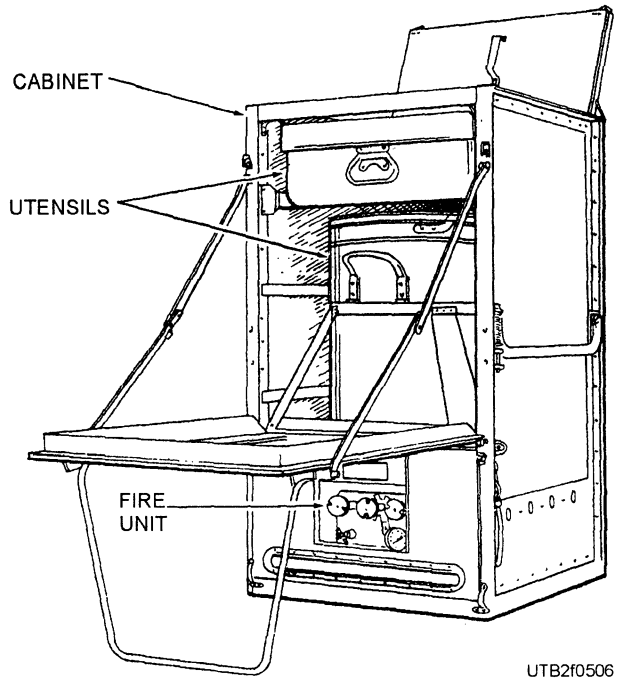

Figure 5-6.—Field range with fire unit in position for cooking.

BAKERY OVENS

Routine maintenance of bakery ovens (fig. 5-7) requires weekly, monthly, and annual inspections.

The WEEKLY inspections should include the following:

- Adjust the heating units for proper fuel-air mixtures and constant operating temperature.
- Check the pilot flame of the gas-fired ovens and adjust it, if necessary, so the burner gas ignites without wasting fuel and the flame is not blown out by the flue draft. Adjust the fuel-air mixture to produce a blue flame.
- Check the operation of the purging fan and the flame failure devices.
- Clean the soot and dirt from the pilot and gas burner.
- Check the oil supply for eaks and stoppages and clean the strainer basket of oil-fired ovens.
- Examine the operation of the electric-ignition and flame-failure devices, and repair them if necessary.
- Adjust the oil burner for proper spread of fuel across the combustion chamber and for proper fuel-air mixture to maintain a blue flame.
- Examine the operation of dampers and clean and adjust them if required.
- Check the settings of automatic temperature and humidity controls; reset the settings of the thermostat and humidistat if necessary.

The MONTHLY inspections should include the following:

- Inspect the conveyor and drive and adjust loose chains, belt tension, and any other component that may be misaligned.
- Adjust the chains of the V-belt tension by moving the idler sprocket or sliding motor base.
- Check the lubrication of gearboxes, bearings, and moving parts.
- Examine the oven top and walls for cracks and breaks; make the repairs if necessary to ensure tightness.

The ANNUAL inspections should include the following:

- Drain, flush, and renew the lubricant in the gearboxes. Check the sprockets, gears, and

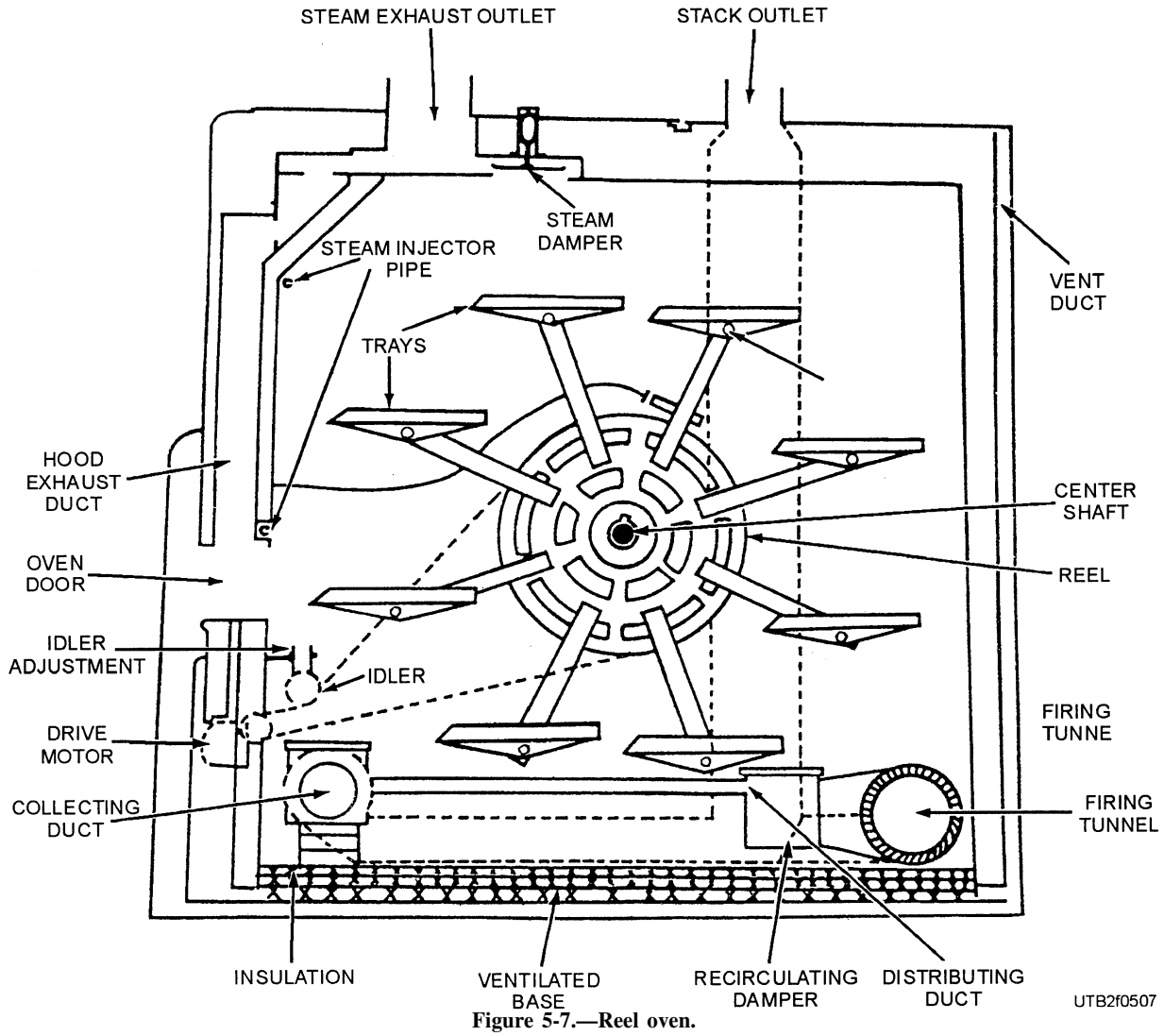

Figure 5-7.—Reel oven.

bearings and renew the lubricant according to the manufacturer's instructions.

- Conduct electrical checks of the insulation resistance of motor windings, controls, and wiring. Clean all contacts of the controls.

INTERCEPTORS AND GREASE TRAPS

Removal of grease from greasy wastes is necessary if the sewage system is to function properly. One way grease is collected is by ceramic or cast-iron grease interceptors installed inside mess halls. Among the types of interceptors you may encounter is the Zurn interceptor shown in figure 5-8. Another way of collecting grease is to use concrete or brick grease traps outside of buildings. Mess personnel usually clean the inside interceptors but you may have to clean the outside traps. When inside grease interceptors are maintained properly, they should collect most of the grease from the waste. They may need cleaning once each day.

Remember that outside grease traps are intended to serve kitchen plumbing fixtures and equipment only. So they should never be connected to soil and waste lines from toilet rooms. To help ensure proper functioning, clean grease traps at least once a week. Since accumulated odor-forming solids cause septic action within a short time, remove all solids each time the traps are cleaned.

The steps of the procedure for cleaning outside grease traps include the following:

1. Skim grease from the surface of the trap using an ordinary perforated sewer scoop, and place it in suitable containers for disposal.
2. Remove as much odor-forming material as possible with the same scoop. Treat this refuse as disposable.

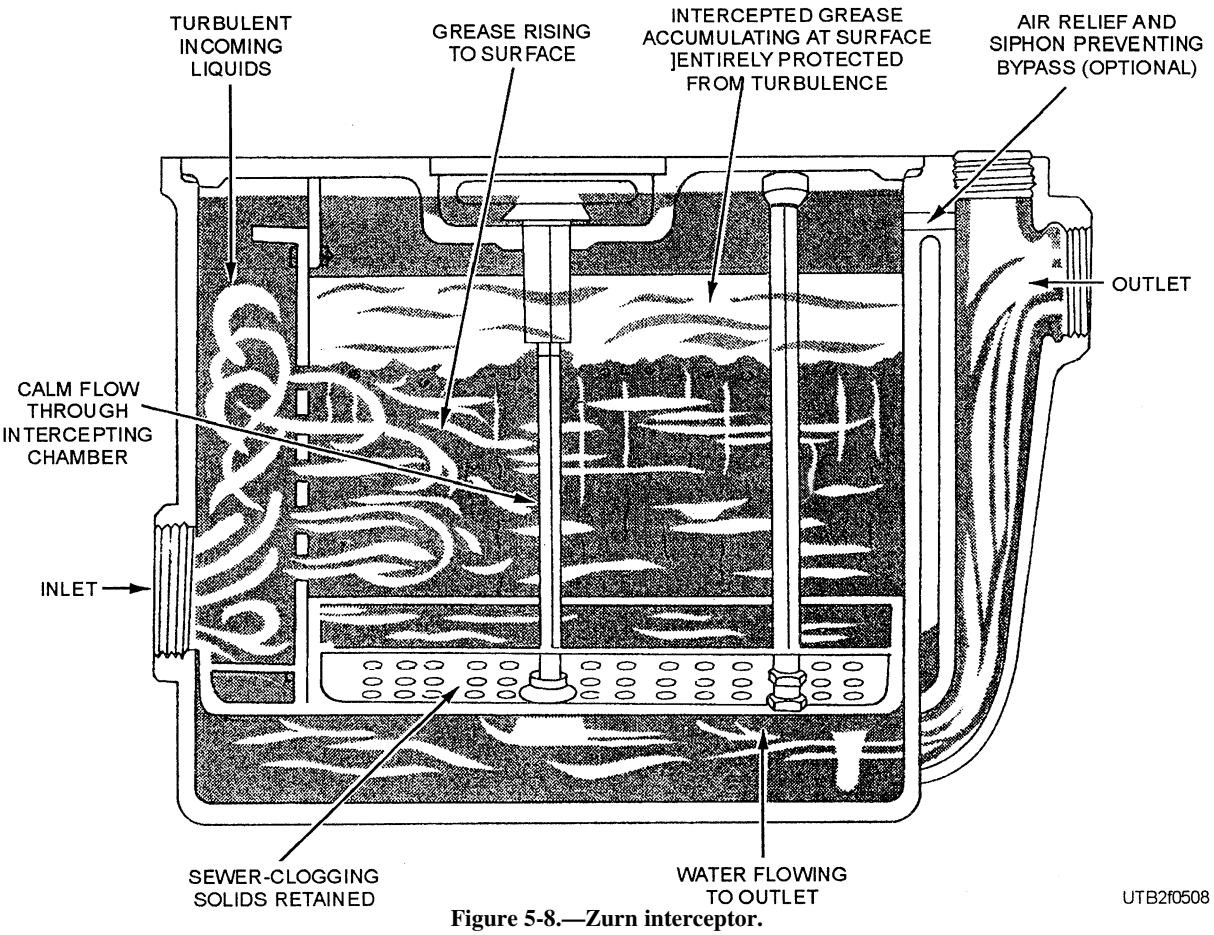

Figure 5-8.—Zurn interceptor.

3. Pump out the liquid from the traps every 3 months, and remove all sediment from the sidewalls and the bottom if necessary.

Q1. *What person is responsible for conducting sanitary inspections of galley equipment?*

Q2. *What type of steam kettle generates its own steam?*

Q3. *When a plunger type of valve is used on steam chests, the valve must be fully depressed when the steam chest compartment door is closed. True/False.*

Q4. *How often should the temperature control on a steam table be calibrated?*

Q5. *A steam table thermostat must be accurate within plus or minus how many degrees. in Fahrenheit?*

Q6. *The wash water temperature of a dishwasher should be maintained within what temperature range, in degrees Fahrenheit?*

Q7. *Steel wool should never be used to clean interior surfaces of dishwashers for what reason?*

Q8. When the proper air-oil mixture is present, a range burner will have a flame that is what color?

Q9. *How often should the pilot and gas burner be inspected for soot and dirt?*

Q10. Other than ceramic or cast iron, what types of grease traps are used?

Q11. How often should liquid be pumped from a grease trap?

LAUNDRY EQUIPMENT

Learning Objective: Recall the procedures for installation, maintenance, and repair of laundry equipment.

Laundry equipment varies from one activity to another, depending upon such factors as the size of the laundry and the differences in individual types of equipment produced by various manufacturers, such as Pellen-Milnor, Bock, Cissell, or Huebsch. Some common types of equipment used in most laundries are washers, extractors, and drying tumblers.

One type of laundry unit you may encounter in your work is shown in views A, B, and C of figure 5-9. This laundry unit is mounted on three skids that are fitted together in assembling; the unit. On one skid is the washer unit, which consists of two, 75-pound, 26- by 26-inch end-loading washers, and one 30-inch top-loading extractor. View C shows the extractor and the back of the washers more clearly. The middle skid has the dryer unit, which consists of two 42- by 42-inch steam-heated drying tumblers, one air compressor, an electric-driven motor, and one stainless steel surge tank. The other skid has the boiler unit; it consists of an oil-fired 33-horsepower steam generator with a return hot well, a water softener, and a 350-gallon hot-water storage tank. This laundry unit can wash and fluff dry 225 pounds (dry weight) of laundry per hour.

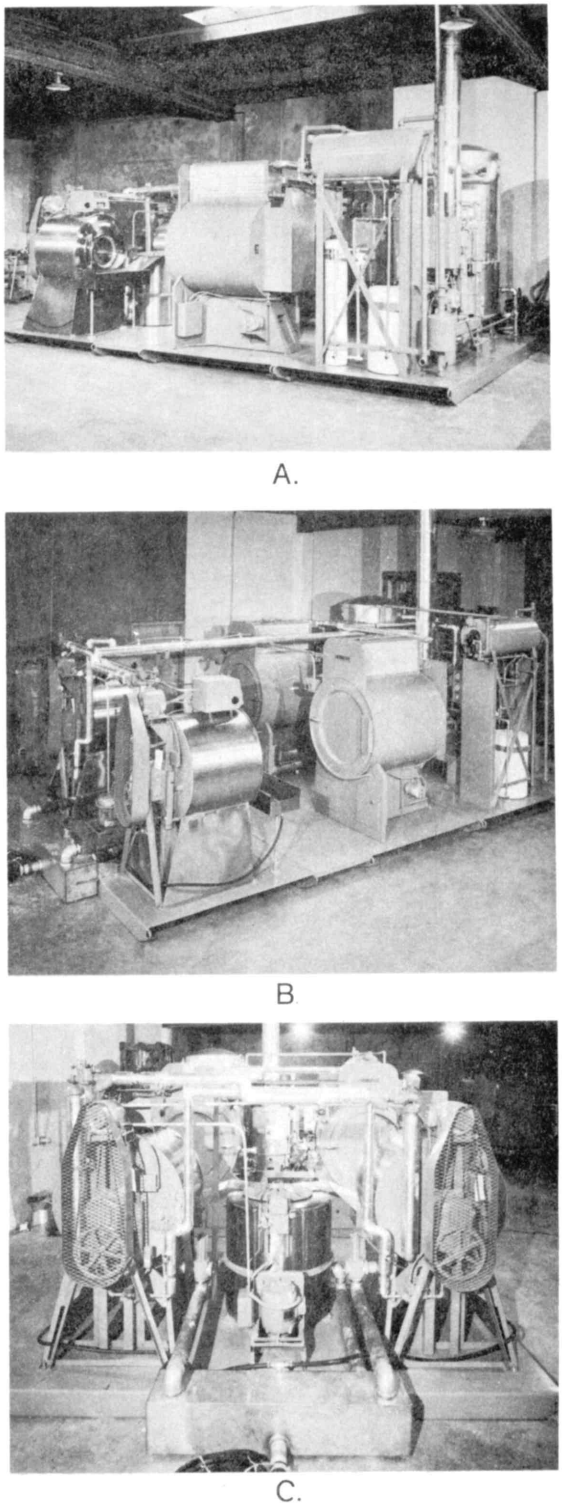

Figure 5-9.—Skid-mounted laundry unit.

In the following sections, information is provided about the installation, maintenance, and minor repair of laundry equipment. This information is not intended to furnish all the details you need to know concerning installation, maintenance, and repair of washers, extractors, drying tumblers, and steam generators. For specific information, you should always refer to the instruction manual provided by the manufacturer of the equipment.

WASHER

The purpose of a washer is to wash clothes and other suitable materials. The washing process is a series of baths during which soil is loosened from the materials, suspended in the water, and finally rinsed away. Several baths are usually necessary to remove the soil completely.

Operation

The type of washer most often used at Navy activities is the Pellerin-Milnor end-loaded, fully automatic washer (fig. 5-10) that is often referred too simply as the "Milnor." This washer is provided with a removable FORMULA CHART, which can be easily changed at the discretion of the operator. Each formula chart provides a full 88 minutes of operation if desired. Marker labels affixed to the formula show the operation in progress and which supplies are needed when the timer signals. The Milnor washer is also equipped with a Miltrol timer to carry the washer through a complete cycle by following the formula cut in the chart.

The Milnor washer has an automatic supply injector unit that consists of five compartments. Various supplies are placed into these compartments at the start of the washing cycle. At a designated time, the supplies are flushed from each compartment into the washer.

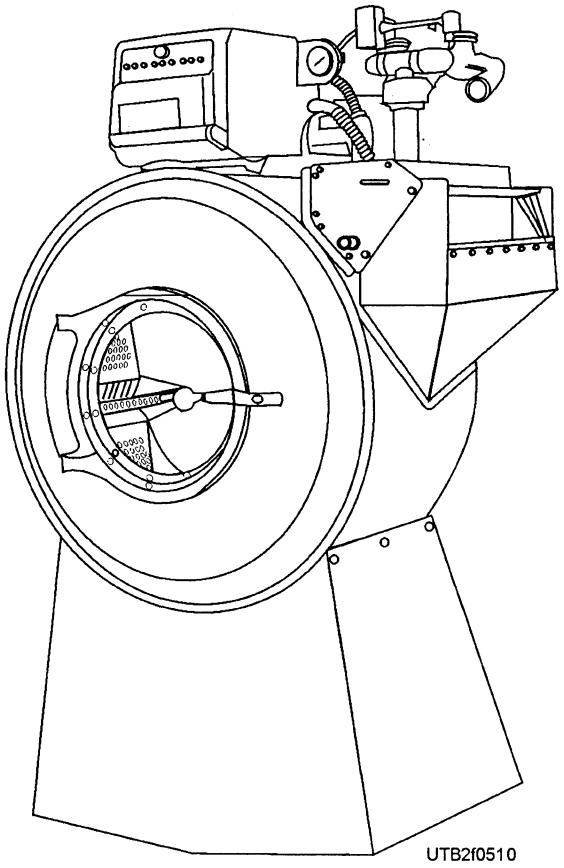

Figure 5-10.—Washer.

Machines equipped with automatic supply injection may also be operated manually at any time. To operate manually, however, you must turn the chart to the uncut position. When required, the Milnor washer can be supplied with an electrically operated tempering control to thermostatically control the temperature of the water for the washer.

Milnor washers, when required, can be furnished with a device to inject supplemental steam automatically when called for by the formula chart and raise the water temperature above that available from the hot-water source. This device can also be used to maintain minimum hot-water temperature in the washer when the normal hot-water source is unable to generate enough hot water to keep up with the hot-water demand of the plant or to raise the water tern perature near the boiling point.

Installation

The steps required to install the Milnor washer are as follows:

1. Install the washer on a steady, level floor, or foundation. Make sure the machine is properly bolted down to prevent vibration.
2. Assemble the water inlet valves on the rear shell of the washer. (The water inlet valve assembly and two water inlet valve strainers are shipped inside of the washer.) Assembling the inlet valves consists of plugging in a twist-lock connection to the rear of the Miltrol timer or plugging bullet connectors into rubber sleeves, as shown on the inside of the Miltrol box.

NOTE

On some models, the inlet valves are permanently attached and wired to the control and do not require installation.

3. Connect the hot and cold waterlines to the hot- and cold-water inlet valves. (The hot-water valve is on the left, and the cold-water valve is on the right when you face the front of the washer.)
4. Install one of the strainers in each of the waterlines just ahead of the solenoid valve. Note that some machines have water valves that do not require strainers, so when this type of valve is used, no strainers are shipped inside of the washer cylinder.
5. Some models are furnished with a "Steam Boil" circuit to allow any or all of the washing operations at boiling temperature. In such cases, connect the steam line to the steam solenoid valve near the bottom of the washer shell at the rear of the machine.
6. To eliminate water hammer when the inlet valves close, connect the inlet valves to the water main with a short piece of rubber hose (about 15 to 24 inches long) between the water main and the upstream side of the strainers. The elasticity of the rubber hose prevents the pounding noise that might otherwise occur every time an inlet valve is closed.
7. Water inlet valves are rated to handle a maximum of 90-psi pressure. A pressure-reducing valve should be used to limit water pressure when the pressure exceeds this figure. The steam valve (when furnished) is rated to handle a maximum of 110-psi pressure, and a pressure-reducing valve should be used to limit steam pressure when it exceeds this figure.
8. Connect the pressure supply for the automatic drain valve to the air line or to the cold waterline. The automatic drain valve requires a minimum of 25-psi pressure AT ALL TIMES.